SOIL CARBON TRENDS IN RECONSTRUCTED MINE SOILS TO HERBACEOUS AND WOODY VEGETATION PRESCRIPTIONS IN SOUTHWEST VIRGINIA[1]

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Abstract: Public and economic desires to return reclaimed coalmines to native hardwood forest instead of traditional herbaceous rangeland have shifted post-mining land use goals of surface mine reclamation and revegetation in the Appalachian region. This study focuses on the development of soil carbon in coalmine topsoil substitutes under herbaceous or forest vegetation after several decades of weathering in place. In 1982, plots were constructed at the Powell River Project and Educational Research Center in Wise County, VA from the overburden of an adjacent coalmine. Sandstone and siltstone were used in varying ratios as topsoil substitutes. For the duration of the study, subplots have been kept under herbaceous (i.e. tall fescue) or forest (i.e. pitch x loblolly pine, northern red oaks) vegetative cover. Soil samples from 0 to 5 cm, 5 to 25 cm were taken from the herbaceous half in 2008 and from the forested half in 2010 and analyzed for soil carbon contents, including total carbon, soil organic carbon and soil organic matter. Comparisons of carbon contents show how reclamation trajectories can differ with contrasting topsoil substitutes and vegetation. Mine soil chemistry under different vegetation types after several decades of equilibration may be a better predictor of aboveground productivity than recently applied topsoil substitutes. A good practice for coal operators during reclamation and revegetation planning may involve choosing their topsoil substitute mixes based on end land use requirements and expected chemical properties after some degree of weathering and equilibration.

Additional Key Words: reclamation, nitrogen, carbon, phosphorus, *Festuca arundinaceae* Schreb., *Pinus taeda* L., *Pinus* x *rigitaeda*, *Quercus rubra* L.

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